

# "NEUROPATHIC SYMPTOMS WITH SARS COV-2 VACCINATION" A REVIEW

REACT19.ORG

## PRESENTERS

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## RESEARCH

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# SYMPTOMS OF SMALL FIBER NEUROPATHY

PAIN AND BURNING IN THE LOWER AND UPPER EXTREMITIES

"PINS AND NEEDLES"

LOSS OF FEELING IN THE HANDS AND FEET

FEET AND HANDS ARE TENDER OR SORE

CRAMPING IN FEET, ANKLES, CALVES, AND HANDS

NUMBNESS

FATIGUE

INABILITY TO SWEAT

DRY EYES

SKIN DISCOLORATION

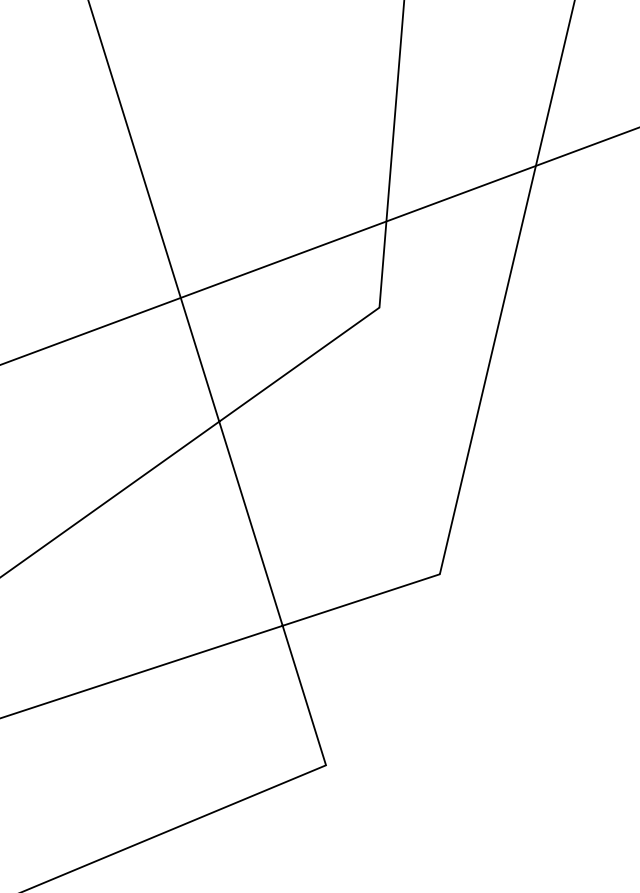
DIZZINESS, LIGHTHEADED

DIFFICULTY BREATHING

INCREASED HEART RATE

DIFFICULTY WITH BOWEL AND BLADDER FUNCTIONS





**PUPILOMOTOR**  
impaired pupil response  
(uncomfortable in bright light)  
difficulty with vision

 **NEUROLOGICAL**  
migraine, cognitive  
deficits, brain fog &  
mental clouding

**SECRETOMOTOR**  
difficulty sweating, tearing  
and other fluid production  
(dry eyes, dry mouth,  
difficulty swallowing, dry skin)

**PULMONARY**  
shortness of breath  
easily winded  
difficulty breathing

**GASTROINTESTINAL**  
nausea, vomiting, diarrhea,  
constipation, abdominal  
pain, reflux, heartburn,  
impaired motility

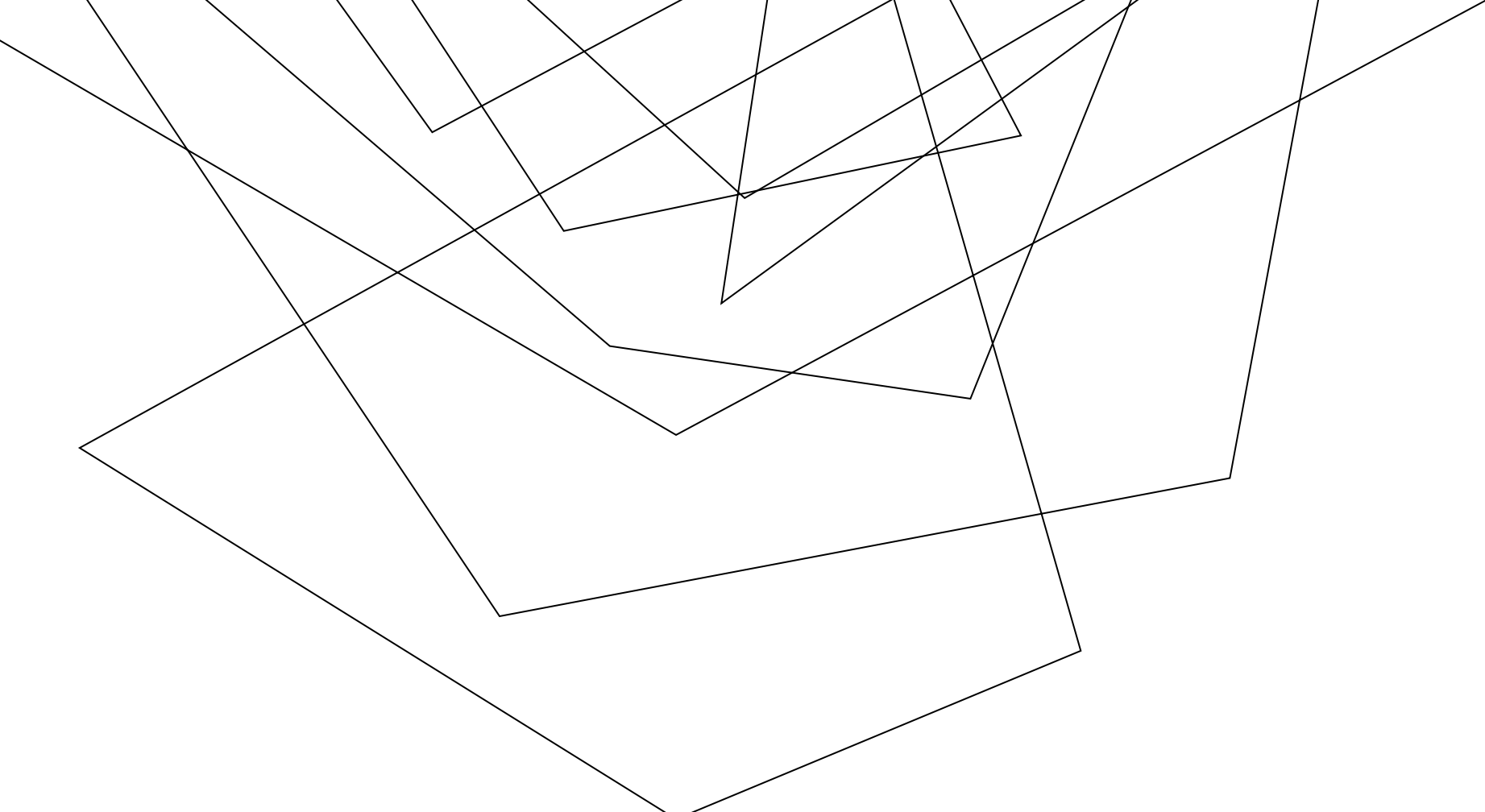
**CARDIOVASCULAR**  
palpitations, chest discomfort  
high heart rate (tachycardia)  
low heart rate (bradycardia)  
high or low blood pressure  
abnormal blood vessel functioning  
blood pooling

Symptoms can be  
**SUDDEN** and  
**unpredictable**  
in onset

 **URINARY**  
difficulty with urine  
retention and/or excretion

**ORTHOSTATIC INTOLERANCE**  
difficulty standing still, fatigue, lightheadedness,  
increase in symptoms with upright posture,  
fainting (syncope) or near-fainting, pallor

# DYSAUTONOMIA



# NEUROPATHIC SYMPTOMS WITH SARS COV-2 VACCINATION

NIH – National Institutes of Health [[LINK TO STUDY](#)]

**NIH –  
NATIONAL INSTITUTES OF HEALTH**

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## ABSTRACT:

"Various peripheral neuropathies, particularly those with sensory and autonomic dysfunction may occur during or shortly after acute Covid-19 illnesses. These appear most likely to reflect immune dysregulation. If similar manifestations can occur with the vaccination remains unknown.

"This observational study suggests that a variety of neuropathic symptoms may manifest after SARS-COV-2 vaccinated and in some patients might be an immune-mediated process..."

"...Further investigation is required to explore underlying mechanisms and targeted therapies for these neurologic disorders."

# DEMOGRAPHICS

23 PATIENTS REPORTING NEW NEUROPATHIC SYMPTOMS BEGINNING  
WITHIN 1 MONTH AFTER SARS-COV-2 VACCINATION

**92% Female**

2 male – 21 female

**Median age 40 years**

Age range from 27-69 years old

**100% reported sensory symptoms**

**61% had orthostasis, heat intolerance  
and palpitations**

**0% had previous neurological illness**

**52% had objective evidence of small-fiber  
peripheral neuropathy**

# OBJECTIVE FINDINGS

## AUTONOMIC AND NEUROPATHY

### Autonomic

7 of 12 had reduced distal sweat production

6 of 12 had positional orthostatic tachycardia syndrome

### Electrodiagnostic

Test results were normal in 94%

Imaging – 100% of MRIs were normal

### Small Fiber Neuropathy

16 lower leg biopsies –

31% had diagnostic/subthreshold epidermal neurite

13% were borderline

19% showed abnormal axonal swelling





# UNDERSTANDING COMPLEMENT AND C4D AND ITS IMPLICATIONS IN SMALL FIBER NEUROPATHY - PART 2

The complement system, also known as the complement cascade, is a **complex process that is part of the immune system**. In laymen's terms, it is a defense system comprised of proteins and enzymes designed to clean our bodies of microbes and damaged cells, and cellular debris. For example, when a foreign antigen (say a virus or viral particle) enters the body, these surveillance proteins recognize the foreign invader and begin a cascading alert system. This can be compared to one person seeing a fire, then telling another person who tells another, who then alerts the fire department. Along this process a series of enzymatic reactions happen. If this system is overwhelmed dysfunction can occur. In some cases this can lead to a "dysimmune response".

In the case of the NIH study, the sub-complement C4d, was found in endothelial cells or cells that line vessels. C4d is a microscopic protein that is "sticky" and thus adheres tightly to endothelial cells. This was an important finding in the study and a probable cause of the small fiber neuropathy seen in the covid-19 vaccine injuries. The resulting neuropathy symptoms are caused by C4d getting "stuck" at the blood-nerve-barrier.

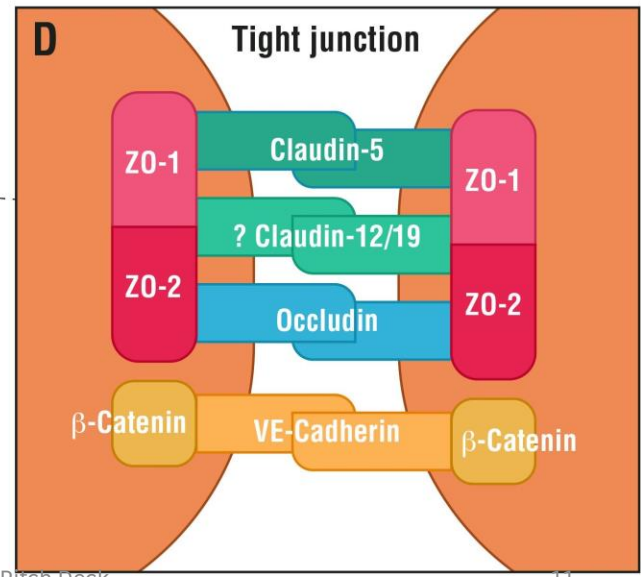
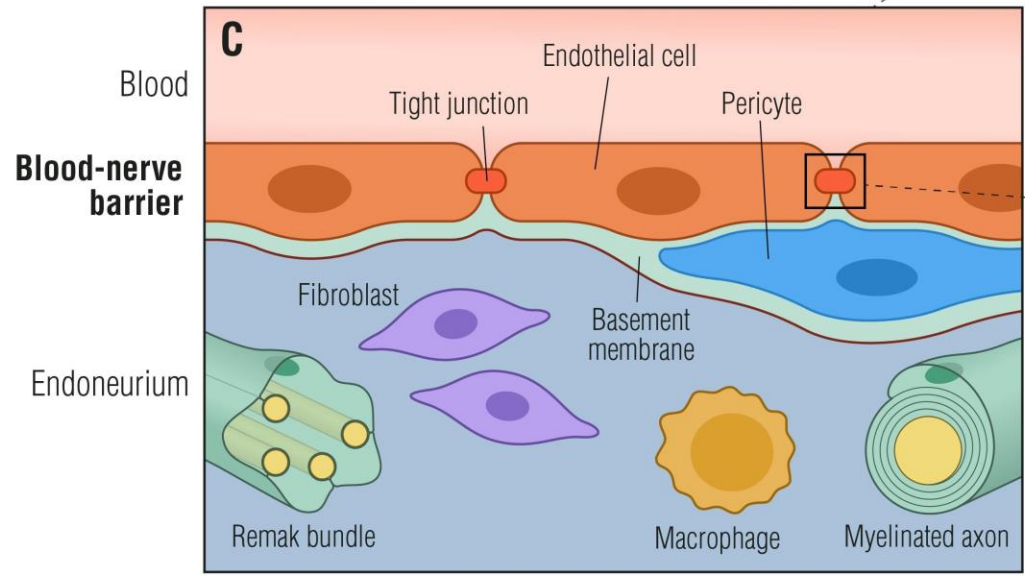
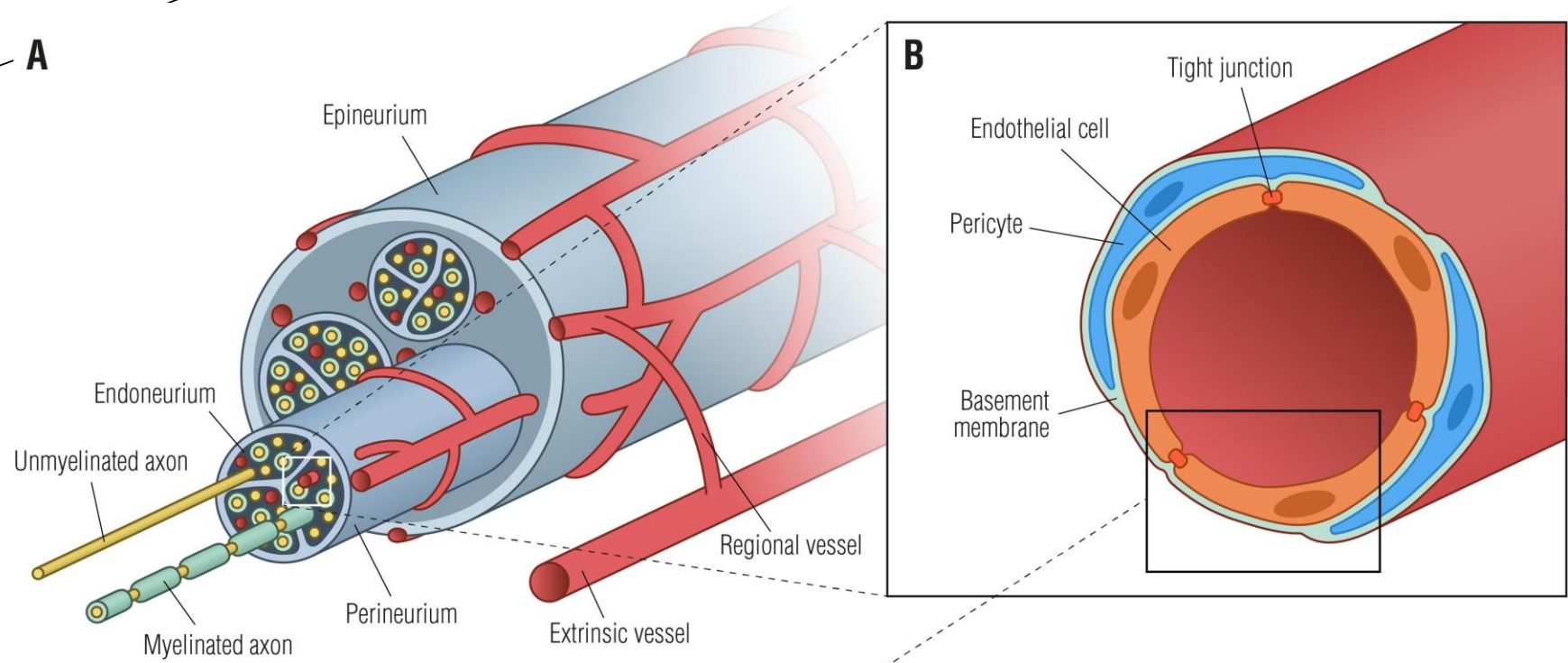
Vessels and nerves run parallel as nerves need blood supply. If the complement system breaks down (by being suddenly overwhelmed by production of spike protein) an error can occur where C4d production continues and the system's ability to self-regulate is inhibited. Once C4d is circulating and enters the micro-circulation such as capillaries that feed nerve, blood supply to the nerves may be cut off. The result of this is neuropathic pain as the small nerve fibers are damaged or die. Halting this dysimmune process is critical to restore normal nerve function. It is critical to intervene early to limit nerve damage and dysfunction. Intravenous immunoglobulin therapy has been shown in studies to be an effective treatment to modulate the immune system.

## [SFN and Pain](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4074641/)

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4074641/>

## [IVIG w/ SFN](https://n.neurology.org/content/96/20/e2534)

<https://n.neurology.org/content/96/20/e2534>



# BLOOD-NERVE BARRIER

# BLOOD-NERVE BARRIER - SCIENCEDIRECT.COM

<https://www.sciencedirect.com/topics/neuroscience/blood-nerve-barrier#:~:text=The%20blood-nerve%20barrier%20is%20a%20physiological%20boundary%20between,fi bers.%20It%20is%20similar%20to%20the%20blood-brain%20barrier.>

The blood-nerve barrier is a physiological boundary between the [peripheral nerve axons](#) and the bloodstream that prevents the transfer of substances from the plasma to the nerve fibers. It is similar to the blood-brain barrier. There is selective permeability to solutes within the [endothelial cells](#) of the endoneurial continuous capillaries and in the internal layers of the [perineurium](#)

Endothelial cells from endoneurial vessels joined tightly together by specialized junctions minimize capillary permeability. Adjacent to the capillaries, the perineurial sheath is composed of large numbers of tight junctions between the perineurial cells, isolating each fascicle from the interfascicular and epineurial environment. The blood-nerve barrier maintains and guarantees axonal function in the [peripheral nerves](#).

## **Blood–Brain Barrier**

The BBB and blood–nerve barrier represent dynamic, tightly regulated interfaces that separate nervous tissue from many blood-borne materials. The BBB consists mainly of specialized capillary [endothelial cells](#) in which the presence of complex tight junctions...Glial cell processes (mainly astrocytic) are also implicated in the regulation, maintenance, and repair of these barriers.

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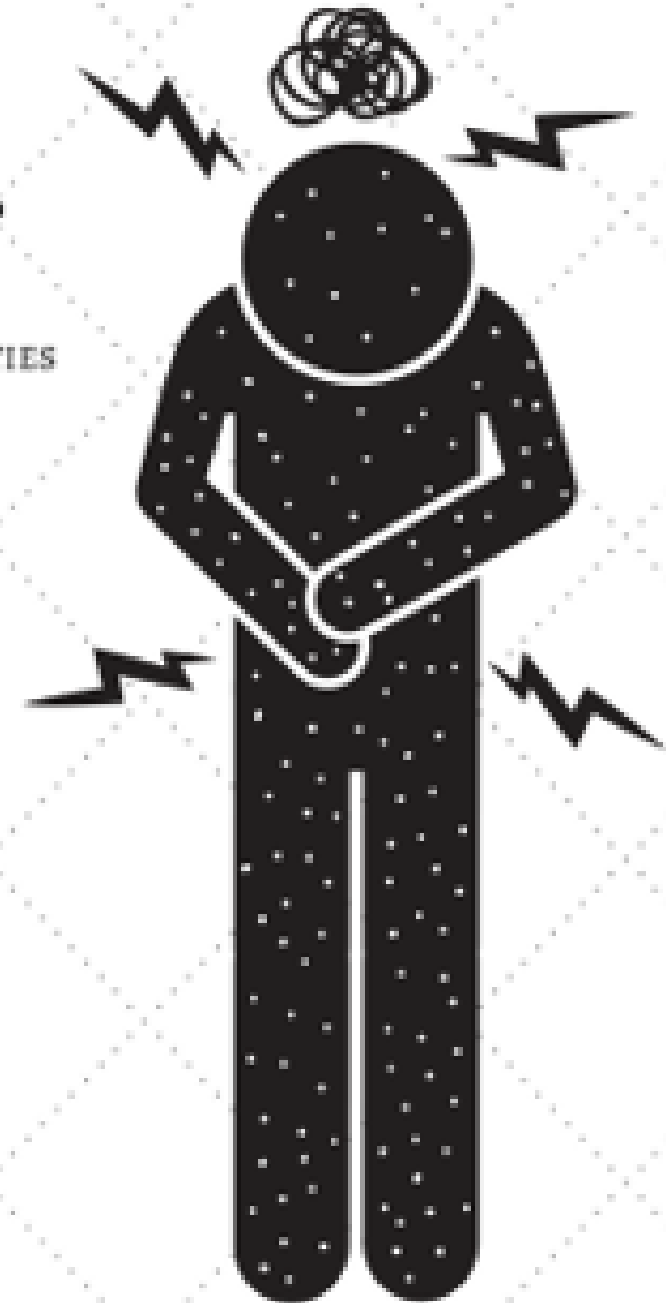
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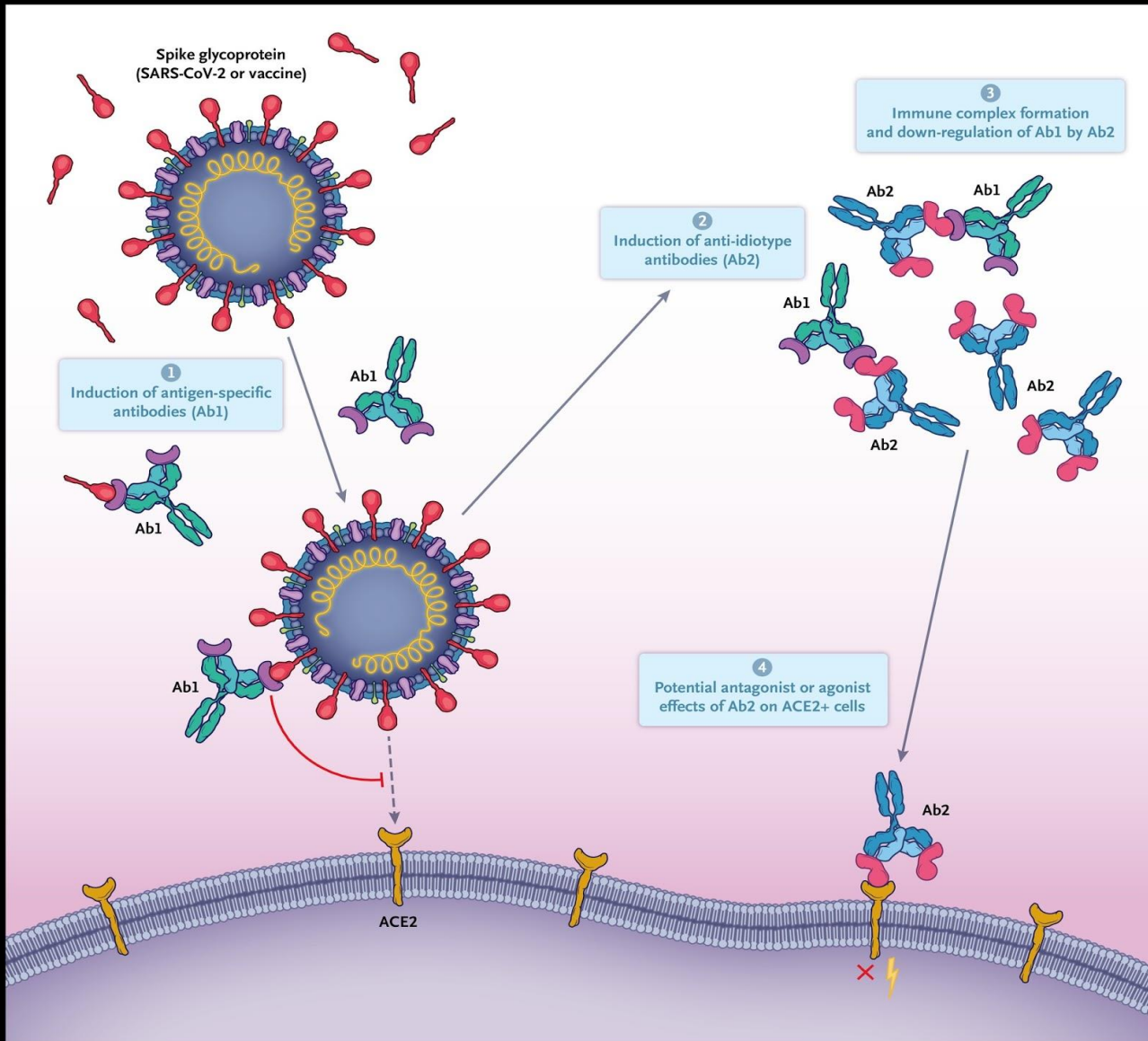
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Pitch Deck

# AUTO ANTIBODIES AUTONOMIC AND NEUROPATHY

"All our patients had neuropathic symptoms but objective findings of SFN were present in a few patients only."

"Anti-spike protein immune responses may link post-Covid and post-vaccine syndromes."

"In studies of mouse sensory ganglia, small-fiber neurons preferentially display the ACE-2 docking protein for SARS-COV- consistent with a potential predominance of SFN."



# LIMITATIONS AND CONSIDERATIONS:

- Small patient population, limited by an observational study.
- Evaluation for a short period of time
- Did NOT rule out possible vaccine involvement
- Future studies are needed:
  - Skin Biopsies to look for C4d
  - Auto-Antibodies
  - Study with larger population, longer duration
  - Neuro-specific studies are needed